

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>08337.4</b>	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. <b>PCT/EP2004/003014</b>	International filing date (day/month/year) <b>22.03.2004</b>	Priority date (day/month/year) <b>21.03.2003</b>
International Patent Classification (IPC) or national classification and IPC		
Applicant <b>CEMECON AG</b>		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>11</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>8</u> sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																									
<p>4. This report contains indications relating to the following items:</p> <table border="0"> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>		<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input checked="" type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input checked="" type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application
<input checked="" type="checkbox"/>	Box No. I	Basis of the report																							
<input checked="" type="checkbox"/>	Box No. II	Priority																							
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability																							
<input type="checkbox"/>	Box No. IV	Lack of unity of invention																							
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement																							
<input checked="" type="checkbox"/>	Box No. VI	Certain documents cited																							
<input type="checkbox"/>	Box No. VII	Certain defects in the international application																							
<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application																							

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

Best Available Copy

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/003014

Box No. I

Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 2, 5, 8-19 as originally filed/furnished
- pages\* 1, 3, 3a, 4, 6, 7 received by this Authority on 20.01.2005 with letter of 18.01.2005
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* 1, 7 received by this Authority on 20.01.2005 with letter of 18.01.2005
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1-5 as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/003014

Box No. II

Priority

1. ☐ This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
- ☐ copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2. ☐ This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

1. The priority date, 21 March 2003, is admissible.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/003014

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	4, 6, 7	YES
	Claims	1-3, 5	NO
Inventive step (IS)	Claims		YES
	Claims	1-7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
1. Reference is made to the following documents:			
D1: Ali N et al: "Promoting secondary nucleation using methane modulations during diamond chemical vapor deposition to produce smoother, harder, and better quality films", J. Mater. Res. (USA), Journal Of Materials Research, Feb. 2003, Mater. Res. Soc, USA, vol. 18, no. 2, February 2003 (2003-02), pages 296-304, XP009034569 ISSN: 0884-2914			
D2: Ali N et al: "Deposition of polycrystalline diamond films using conventional and time-modulated CVD processes", Thin Solid Films, Elsevier Sequoia, NL, vol. 420-421, 2 December 2002 (2002-12-02), pages 155-160, XP004397837 ISSN: 0040-6090			
D3: Fan Q H et al: "Novel time-modulated chemical vapor deposition process for growing diamond films", J. Mater. Res. (USA), Journal Of Materials Research, July 2002, Mater. Res. Soc, USA, vol. 17, no. 7, July 2002 (2002-07), pages 1563-1566, XP009034570 ISSN: 0884-2914			
/...			

Best Available Copy

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

- D4: Lee J-W et al: "Cyclic technique for the enhancement of highly oriented diamond film growth", Thin Solid Films, Elsevier-sequoia S.A. Lausanne, CH, vol. 303, nos. 1-2, 15 July 1997 (1997-07-15), pages 264-268, XP004087644 ISSN: 0040-6090
- D5: Komarov S F et al: "Self-limiting Diamond Growth From Alternating CFx And H Fluxes", Diamond And Related Materials, Elsevier Science Publishers, Amsterdam, NL, vol. 7, no. 8, 1 August 1998 (1998-08-01), pages 1087-1094, XP000668682 ISSN: 0925-9635
- D6: US-A-5 567 522 (Takahashi Toshiya et al) 22 October 1996 (1996-10-22)
- D7: DE 199 22 665 A (Fraunhofer Ges Forschung) 23 November 2000 (2000-11-23)
- D8: WO 01/18284 A (Vandenbulcke Lionel; Barros Maria Isabel DE (FR)) 15 March 2001 (2001-03-15)
- D9: Chen L C et al: "Growth Of Highly Transparent Nanocrystalline Diamond Films And A Spectroscopic Study Of The Growth", Journal Of Applied Physics, American Institute Of Physics, New York, US, vol. 89, no. 1, 1 January 2001 (2001-01-01), pages 753-759, XP001053812 ISSN: 0021-8979
- D10 Jiang N et al: "Synthesis and structural study of nano/micro diamond overlayer films", Journal Of Crystal Growth, North-holland Publishing Co. Amsterdam, NL, vol. 242,

/...

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

nos. 3-4, July 2002 (2002-07), pages 362-366,  
XP004368868 ISSN: 0022-0248

D11 Ali N et al: "Nanocrystalline diamond films  
deposited using a new growth regime", Mater.  
Sci. Technol. (UK), Materials Science And  
Technology, July 2003, Inst. Mater, UK,  
vol. 19, no. 7, July 2003 (2003-07),  
pages 987-990, XP009034515 ISSN: 0267-0836

D12 Ali N et al: "Implementation of the time-  
modulated process to produce diamond films  
using microwave-plasma and hot-filament CVD  
Systems", Vacuum (UK), Vacuum, 25 July 2003,  
Elsevier, UK, vol. 71, no. 4, 25 July 2003  
(2003-07-25), pages 445-450, XP002290488  
ISSN: 0042-207X.

2. The present application fails to satisfy the  
requirements of PCT Article 33(1) because the  
subject matter of claim 1 lacks novelty (PCT  
Article 33(2)).

Document D9 discloses (see page 1, lines 5-13;  
page 2, lines 3-7; page 4, lines 3-7; page 5,  
lines 19-28) a body with a substrate, said  
substrate being a titanium body coated with an  
adhesive layer, and at least one layer deposited on  
the surface of the substrate, said layer consisting  
of nanocrystalline diamond (1 to 50 nm) and the  
surface thereof having a surface rugosity  $R_z$  which  
is less than the surface rugosity  $R_z$  of the  
substrate surface (see page 5, line 26-27).

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

3. Dependent claims 2 to 6 do not appear to contain any additional features which, in combination with the features of claim 1 to which claims 2 to 6 refer back, might meet the PCT requirements for novelty and inventive step. In fact, in so far as said claims cannot be derived from the aforementioned document, document D9, (claims 2, 3 and 5; see in particular page 12, lines 10 and lines 26-27; page 13, lines 22-23; page 16, lines 26-33), they refer to features which are either completely routine in the technical field in question, or can be arrived at on the basis of general knowledge in said field (claims 4 and 6).

4. The present application fails to meet the requirements of PCT Article 33(1) since the subject matter of claim 7 does not involve an inventive step (PCT Article 33(3)).

A method for CVD-coating, according to which method a diamond layer is deposited on a substrate in an atmosphere of carboniferous gas, the process parameter being varied during coating such that the operation is switched between a first operating state and a second operating state several times during the coating process, an increased carbon supersaturation of the gaseous atmosphere occurring in the vicinity of the substrate in the first operating state, and a reduced carbon supersaturation of the gaseous

/...

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/003014

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

atmosphere occurring in the vicinity of the substrate in the second operating state, has already been disclosed in the prior art (see for example D1, D3, D4 and D7).

The effect of a method of this type on the size of the diamond crystallites, for example a reduction in the size thereof, and on the smoothness of the diamond layer, for example a reduction in the surface rugosity thereof, can clearly be derived from said documents.

The parameters disclosed in documents D1, D3, D4 and/or D7 could be adapted by a person skilled in the art, without inventive input, in order to obtain a layer of nanocrystalline diamond.

Rest Available Copy



## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/003014

Box No. VI

Certain documents cited

## 1. Certain published documents (Rule 70.10)

Application No.  
Patent No.Publication date  
(day/month/year)Filing date  
(day/month/year)Priority date (valid claim)  
(day/month/year)

See Supplemental Box.

## 2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure

Date of non-written disclosure  
(day/month/year)Date of written disclosure  
referring to non-written disclosure  
(day/month/year)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/003014

## Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Claim 7 fails to comply with the requirements of PCT Article 6 because the subject matter for which protection is sought is not clearly defined. The claim attempts to define the subject matter in terms of the result to be achieved ("the switch occurs such that") but in so doing merely states the problem to be solved without giving the technical features required to achieve said result.

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

**Box VI**

1. Although document D11 is not prior art (PCT Rule 64.1 (a) and (b)) because it was published after the priority date, said document discloses all the technical features of independent claims 1 and 7.

D11 has therefore been cited in this report (PCT Rules 64.3 and 70.10).